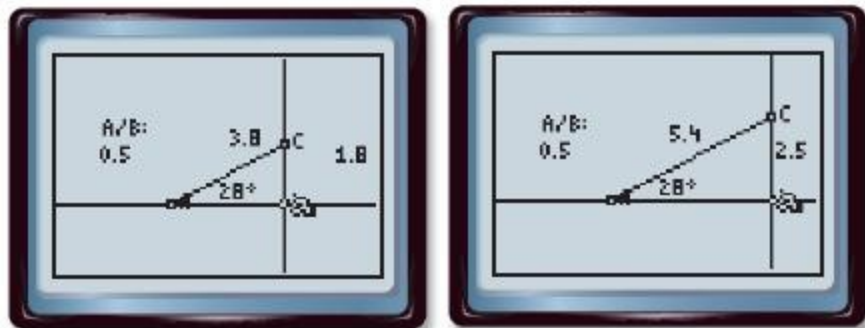


Explore 8-4 Graphing Technology Lab: Trigonometry

Analyze the Results

1. Discuss the effect on $\frac{BC}{AC}$ by dragging point B on \overline{BC} , \overline{AC} , and $\angle A$.

SOLUTION:



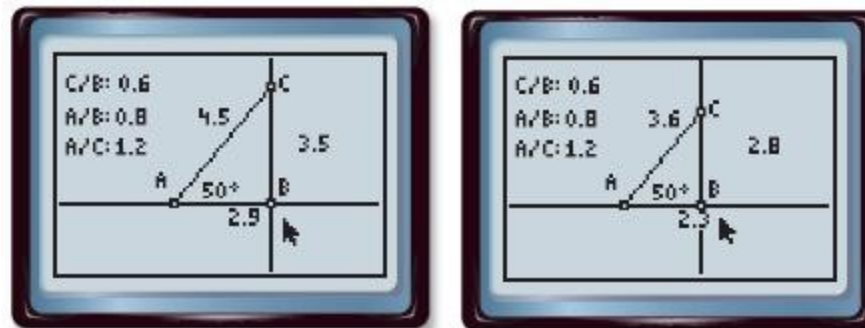
As you drag point B along the horizontal line, notice how BC and AC change, but $BC : AC$ and all of the angle measures remain the same.

ANSWER:

BC and AC change, but $m\angle A$ and $\frac{BC}{AC}$ are unchanged.

2. Use the calculate tool to find the ratios $\frac{AB}{AC}$ and $\frac{BC}{AB}$. Then drag B and observe the ratios.

SOLUTION:



When you drag B along the horizontal line, notice how the side lengths change but the angle measures remain the same. You can see that each side ratio remains the same, as well.

$\frac{AB}{AC}$ and $\frac{BC}{AB}$ are unchanged as B moves.

ANSWER:

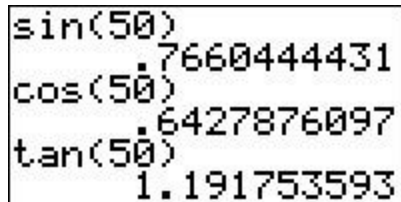
$\frac{AB}{AC}$ and $\frac{BC}{AB}$ are unchanged as B moves.

Explore 8-4 Graphing Technology Lab: Trigonometry

3. **MAKE A CONJECTURE** The *sine*, *cosine*, and *tangent* functions are trigonometric functions based on angle measures. Make a note of $m\angle A$. Exit Cabri Jr. and use s, c, and t on the calculator to find *sine*, *cosine* and *tangent* for $m\angle A$. Compare the results to the ratios you found in the activity. Make a conjecture about the definitions of sine, cosine, and tangent.

SOLUTION:

Based on the triangle explorations from the previous questions, the following relationships exist:



A calculator screen with a black background and white text. It displays the following values:
sin(50) = .7660444431
cos(50) = .6427876097
tan(50) = 1.191753593

Therefore, it can be seen how these values relate to the ratios from the triangles:

$$\sin(50) = .7660 \approx .8 \Rightarrow \frac{BC}{AC}$$

$$\cos(50) = .6428 \approx .6 \Rightarrow \frac{AB}{AC}$$

$$\tan(50) = 1.1918 \approx 1.2 \Rightarrow \frac{BC}{AB}$$

Therefore, the $\sin A = \frac{BC}{AC}$; $\cos A = \frac{AB}{AC}$; and $\tan A = \frac{BC}{AB}$.

ANSWER:

Sample answer: sine $A = \frac{BC}{AC}$; cosine $A = \frac{AB}{AC}$; and tangent $A = \frac{BC}{AB}$.